

BOOKS

International Comparisons of Electricity Regulation, with Edward Kahn, forthcoming. Cambridge University Press.

The Environment of Oil. Kluwer Academic Press, 1993.

Regulatory Choices: A Perspective on Developments in Energy Policy, University of California Press. 1991.

Strategic Competition and Barriers to Entry, with P. Geroski and A. Jacquemin, in series vol. 41: **Theory of the Firm and Industrial Organization**, Lesourne, J. and H. Sonnenschein (eds.), **Fundamentals of Pure and Applied Economics**, Harwood Academic Press, 1990.

CHAPTERS IN BOOKS

"On the Delegation of Pricing Authority in Shared ATM Networks." in M. Guerin-Calvert and S. Wildman (eds.), **Electronic Services Networks: A Business and Public Policy Challenge**, Greenwood, Praeger Publishers, New York, 1991.

"Mobility Barriers and the Value of Incumbency," Chapter 8 in Schmalensee, R. and R. Willig (eds.), **Handbook of Industrial Organization**, North-Holland, 1989.

"Forecasting Technology Adoption with an Application to Telecommunications Bypass," with Jeffrey Rohlfs, in de Fontenay, A., M.H. Shugard and D.S. Sibley (eds.), **Telecommunications Demand Modelling: An Integrated View**, North-Holland, Amsterdam, 1990, pp. 399-412.

"Preemptive Competition," in G. F. Mathewson and J. Stiglitz (eds.), **New Directions in the Analysis of Market Structure**. MIT Press, Cambridge; Macmillan Press, London, 1986.

"Coping with Major Oil Disruptions," in J. Plummer, editor, **Energy Vulnerability**, Ballinger Press, 1982.

"Patents, Sleeping Patents, and Entry Deterrence," in S. Salop, editor, **Strategy, Predation, and Antitrust Analysis**, Federal Trade Commission, 1981.

"The Social and Private Value of Exploration Information," in J. Ramsey, editor, **Symposium on the Economics of Exploration for Energy Resources**, Greenwich CT: JAI Press, 1981.

"Search Strategies and Private Incentives for Resource Exploration," in R. Pindyck, editor, **Advances in the Economics of Energy and Resources**, vol. 2, JAI Press, 1979, pp. 149-169.

"The Economic Common Sense of Controlling Nuclear Power Development," with M. Boskin, **The California Nuclear Initiative**, Institute for Energy Studies, Stanford University, 1976; also published in **California Energy: The Economic Factors**, Federal Reserve Bank of San Francisco, 1976.

"A 1.1 GHz Scanned Acoustic Microscope," in **Acoustical Holography**, vol. 4, Plenum Press, 1972.

WORKING PAPERS

"Asymmetric Gasoline Price Responses to Crude Oil Price Changes," with Severin Borenstein and A. Colin Cameron.

"An Economic Model of Rationing," with Paul Klemperer.

INVITED LECTURES AND TESTIMONY (Since 1986)

"Compulsory Licensing: Practical Facts and Economic Musings," American Bar Association Section of Antitrust Law, Annual Meeting, Chicago, IL, August 8, 1995. Also presented at Intellectual Property Antitrust 1995, Practising Law Institute, San Francisco, CA, July 20, 1995.

"Joint Venture Access Rules: An Antitrust Evaluation," American Bar Association Section of Antitrust Law, Annual Meeting, Chicago, IL, August 7, 1995.

"Competition in Electric Power Generation: Market Power and Market Pricing," Harvard Electricity Policy Group, Cambridge, MA, April 18, 1995.

"The 1995 Antitrust Guidelines for the Licensing of Intellectual Property: New Signposts for the Intersection of Intellectual Property and the Antitrust Laws," American Bar Association Section of Antitrust Law Spring Meeting, Washington, D.C., April 4, 1995. Also presented at The Aerospace Industries Association, Washington, D.C., April 20, 1995; The Fordham International Antitrust Conference, New York, NY, April 21, 1995.

"The Antitrust Agenda in the Clinton Administration," American Bar Association Business Law Section, March 24, 1995.

"The New Federal Antitrust Licensing Guidelines: The Music Behind the Words," Price Waterhouse Intellectual Property Conference, Tucson, AZ, February 23, 1995.

"Intellectual Property and the Antitrust Laws: Protecting Innovators and Innovation," Annual Winter Meeting of the Licensing Executives Society, Phoenix, AZ, February 17, 1995. Also presented at The Conference Board, New York, NY, March 2, 1995; The Antitrust '95 Conference, Washington, D.C., March 15, 1995.

"Traditional Antitrust for Non-Traditional Markets: The Case of High-Tech and Intellectual Property," American Bar Association Conference, Washington, D.C., November 17, 1994.

Interview in *Competition*, The Journal of the Antitrust and Trade Regulation Law Section of the State Bar of California, Vol. 4, No. 2, Fall 1994.

"The Antitrust Division Guidelines for Intellectual Property," Licensing Executives Society Annual Meeting, Crystal City, VA, September 12, 1994. Also presented at the Federal Bar Association, Washington, D.C., September 13, 1994; The Golden State Antitrust and Trade Regulation Institute, Los Angeles, CA, October 6, 1994; The Antitrust Conference, Washington, D.C., October 12, 1994; The American Intellectual Property Law Association, Washington, D.C., October 28, 1994; The Intellectual Property Owners Association, Washington, D.C., December 5, 1994; The New York State Bar Association, New York, NY, January 26, 1995.

"The Antitrust Division 1994 Intellectual Property Guidelines," ABA Antitrust Section, Amelia Island, FL, August 11, 1994.

"Emerging Issues in Intellectual Property Antitrust: Recent Antitrust Division Guidelines for Intellectual Property," ABA Annual Meeting, Antitrust Section, New Orleans, LA, August 9, 1994.

"Antitrust Issues Confronting High-Technology Companies in a Coverging Industries Information Age: Mergers, Joint Ventures, Strategic Alliances," ABA Annual Meeting, Antitrust Section, New Orleans, LA, August 8, 1994.

"The Clinton Administration's Views on the Application of the Antitrust Laws to Intellectual Property, Technology Exploitation, and Innovation," Practising Law Institute, San Francisco, CA, July 15, 1994.

"Antitrust Policy in High Technology Markets: A View from the Antitrust Division," D.C. Bar Trade Regulation and Intellectual Property Committees, Washington, D.C., June 15, 1994; also presented at the D.C. Bar Association's Patent, Trademark, Copyright Section Annual Luncheon, Washington, D.C., June 21, 1994.

"The Use of Innovation Markets in Merger Analysis," Conference on Post-Chicago Economics, Washington, D.C., May 26, 1994.

"Antitrust and Regional Electricity Transmission Groups,"
Program on Workable Energy Regulation Annual Conference,
Oakland, CA, May 19, 1994.

"The Antitrust Division Intellectual Property Task Force,"
American Intellectual Property Law Association, Cleveland, OH,
April 22, 1994.

"Antitrust Issues in Patent Infringement Litigation: The
Antitrust Counterattack," ABA Section of Antitrust Law 42nd
Annual Spring Meeting, Washington, D.C., April 7, 1994.

"The Licensing of Intellectual Property," presented at San
Francisco Patent and Trademark Law Association, San
Francisco, CA, March 19, 1994.

"Intellectual Property," Law & Technology Seminar Workshop,
Boalt School of Law, University of California, Berkeley, CA,
March 16, 1994.

Statement submitted to the Subcommittee on Patents,
Copyrights and Trademarks, Committee of the Judiciary,
United States Senate, Concerning the Patent Term Publication
Reform Act of 1994, March 9, 1994.

"Product Distribution Arrangements: Legal and Economic
Issues," The Conference Board, New York, NY, March 3, 1994.

"Intellectual Property Licensing Issues: A View from the
Antitrust Division," Practising Law Institute, New York, NY,
March 1, 1994; also presented at San Francisco, CA, April 8,
1994.

"Mergers in High Technology Industries," presented at the
Antitrust Practice Group, San Francisco, CA, February 4, 1994.

"Antitrust Policy in High Technology Markets," presented at the
conference of the Association of American Law Schools, Orlando,
FL, January 7, 1994.

"An Equilibrium Theory of Rationing," presented at the Federal Trade Commission, Washington, D.C., November 17, 1993.

"Asymmetric Gasoline Price Responses to Crude Oil Price Changes," presented at the NBER Conference on Industrial Organization, Boston, December 6, 1991.

"Do We Need a National Energy Strategy?," invited comments before the Subcommittee on Economic Stabilization, Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, October 17, 1991.

"Developments in Electricity Regulation," presented at the Latin American Meetings of the Econometrics Society, Montevideo, Uruguay, August 28, 1991.

Comments on the outlook for petroleum prices, KPIX-TV, January 15, 1991.

Comments on the petroleum industry, Public Radio Broadcasting Network, September 3, 1990.

"Developments in Energy Regulation," Conference on Bidding for Electric Power, Davis, Ca, March 1990.

"Pricing Delegation in Shared ATM Networks," Annenberg Conference on Electronic Service Networks, February 1990.

"Outlook for Competition in Electric Power Markets," California Public Utility Commission, February 1990.

"Progress of Deregulation in the U.S.," Montevideo, Uruguay and Buenos Aires, Argentina, August 1989.

"Entry vs. Acquisition," Harvard University, March 1989; also presented at U.S. Department of Justice, October 1988.

"The Role of Potential Competition in Industrial Organization," invited lecture, Bank of San Paolo, Turin, Italy, June 1988.

"Competition in Electric Power Markets," Executive Seminar on Utility Regulation, University of California, Berkeley, June 1988.

"Multiproduct Competition," presented at University of California, April 1988. Also presented at Stanford University, May 1988, University of Florence, June 1988.

"Rate Reform in Competitive Electric Power Markets," presented at the Management Institute of Berlin, May 1987.

"Lectures in the Theory of Economic Regulation," presented at the Autonomous University of Barcelona, May 1987. Also presented at the Stockholm School of Economics, June 1987.

En Banc Testimony before the California Public Utilities Commission on revising rate-making mechanisms for electric utilities, March 1987.

"The Nuclear Industry After Chernobyl," University Explorer Series #860630, June 30, 1986.

INDUSTRY AND LITIGATION EXPERIENCE
(omits activities during tenure as Deputy Assistant Attorney General)

TESTIMONY

Semiconductor Markets

Testimony on behalf of Intel Corporation regarding competition in semiconductor markets, 1990-92.

Computer Software

Appearance before the Federal Trade Commission on behalf of IBM and Lotus Corporation, 1995.

Computer Maintenance Services

Testimony on behalf of Datagate and Hy-Point technology regarding market definition, 1988-90.

Computer Reservation Systems

Deposition testimony on behalf of System One regarding competitive impacts of practices in the airline computer reservation systems industry, 1989.

Electric Power Markets

Testimony on behalf of the California Public Utility Commission on the impacts of merger in bulk electric power markets, 1989-90.

Testimony on behalf of the Chevron Corporation regarding California Energy Commission siting policy for self-generation facilities, 1985-87.

Financial Markets

Deposition testimony in a class action regarding competitive impacts of savings and loan lending practices, 1982-84.

Deposition testimony in a class action regarding competitive impacts of bank lending practices, 1986.

Geothermal Industry

Testimony on behalf of R.C. Dick Geothermal involving competitive impacts of geothermal field development, 1983-85.

Intellectual Property

Testimony on behalf of Conlux Corporation regarding damages for infringement of electronic coin vending machines, 1992.

Testimony on behalf of Universal Manufacturing involving antitrust and contractual issues in technology development, 1988-89.

Deposition testimony on behalf of Nicolet regarding damages for infringement of semiconductor inspection equipment patent, 1989.

Petroleum Industry

Testimony on behalf of Chevron Corporation regarding crude oil refinery economics, 1991.

Uranium Industry

Testimony on behalf of Chevron Corporation regarding price formation in the uranium fuels industry, 1987-89.

INDUSTRY ANALYSIS

Energy Markets (general)

Formulation of a framework for the Federal Energy Agency for public policy intervention in exhaustible resource markets, 1975-77.

Examination for the Electric Power Research Institute of the effects of risk on the supply of and demand for energy resources. Development of methods for estimating impacts of risk on energy prices and quantities traded in markets, 1976-78.

Analysis for the World Bank of implications of resource limitations and market organization for the economies of developing countries, 1976-82.

Analysis for the Electric Power Research Institute of alternative strategies to mitigate impacts of energy supply disruptions, 1980-82.

Electric Power

Analysis for the Electric Power Research Institute of utility regulatory policies and their consequences for risk-sharing between stockholders and ratepayers, 1982-86.

Analysis of nuclear plant construction economics, 1983.

Chemicals

Analysis on behalf of the U.S. Federal Trade Commission regarding competitive impacts of investment in the titanium dioxide industry, 1978-79.

Petroleum Markets

Evaluation for British Petroleum. Ltd of the effects of contracting policies on the supply, price, and reliability of energy resources, 1978-80.

Analysis for the Chevron Corporation of crude oil refining and transportation economics, 1984-91.

Telecommunications

Consultant to Bell Telephone Laboratories, Murray Hill, NJ, Summer 1982. Evaluation of rate of adoption of new telecommunications technologies.

Analysis for Bell Atlantic of adoption rates for new technologies and development of strategies for the introduction of new telecommunications products and services, 1985-85.

Other

Analysis of the effects of alternative pricing practices for Automated Teller Machines, 1988.

Analysis of competitive behavior in the wood-pulp processing industry, 1984.

Analysis of pricing practices in the retail recorded media market, 1985.

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EDUCATION

Ph.D., M.A., UNIVERSITY OF CALIFORNIA, Economics, Berkeley, 1973-77.
Fields of Emphasis: Industrial Organization, Antitrust, Regulation, Public Finance.
M.A., B.A., MICHIGAN STATE UNIVERSITY, Social Science, 1961-65, 1972-73.

PRESENT POSITION

HAAS SCHOOL OF BUSINESS, UNIVERSITY OF CALIFORNIA, Berkeley, 1977 - present.
Associate Professor, Business & Public Policy Group; and
Co-Director, Consortium for Research in Telecommunications Policy and Strategy

LAW & ECONOMICS CONSULTING GROUP, 1993-present.
Principal-in-Charge, Regulation Practice Group

ACADEMIC HONORS AND AWARDS

Industry Expert Panel, Center for Telecommunications Management, University of Southern California
Charles C. Slater Award (outstanding contribution to the Journal of Macromarketing, 1983-86).
Schwabacher Prize (outstanding University service), 1983.
Phi Beta Kappa, 1977.
Alfred P. Sloan Dissertation Fellowship, 1975-77.
Blue Key and Excalibur Honorary Fraternities, 1964-65.
President, All-University Student Government, 1964-65.

TEACHING

Graduate Courses: Business and Public Policy (MBA Core Course), Competitive Strategies & Public Policies in Telecommunications, Microeconomic Analysis for Managerial Decisions, Industry Analysis and Competitive Strategy, Doctoral Research in Business & Public Policy, Antitrust Law (School of Law, with L. Sullivan), Antitrust Economics (Department of Economics).

Undergraduate Courses: Social and Political Environment of Business (Core Course), Economics of Regulated Industries, The Corporation and the Global Economy.

Executive Education: Competitive Strategy, Telecommunications Policy and Strategy, Public Policy Strategy, Managing Business-Government Relations.

PUBLICATIONS

"Competition and Public Policies in Telecommunications: A Survey of U.S. Developments," presented to Conference on Privatization and Deregulation in the US, UK and Japan, Economic Research Institute of the Economic Planning Agency of Japan, Tokyo, 1995; forthcoming in *Conference Proceedings*.

"Competition and Unbundling in Local Telecommunications: Implications for Antitrust Policy," with Gregory L. Rosston and David J. Teece, presented to Telecommunications Policy Research Conference, Solomons, Maryland, October 1994; forthcoming in *Conference Proceedings*, EAL Press.

"State Regulatory Policies and the Telecommunications/Information Infrastructure," presented to Workshop of the National Research Council, Washington D.C., October 1993; *The Changing Nature of Telecommunications/Information Infrastructure*, National Academy Press, 1995.

"Access and Competition Policy in the Deregulated Rail Freight Industry, with Comparisons to Competitive Access Issues in Telecommunications," with Curtis M. Grimm, presented to Columbia Institute for Telecommunications and Informatics, New York, November 1993; forthcoming in *Conference Proceedings*, Oxford University Press.

"R&D Expenditures by the Bell Operating Companies: A Comparative Assessment," invited paper, Twenty-Third Annual Conference, Michigan State University Institute of Public Utilities, Williamsburg, Virginia, December 9, 1991; *MSU Public Utility Conference Proceedings*, 1993.

"Strategic Uses of Regulation: The Case of Line-of-Business Restrictions in Communications," with Robert A. Blau, presented to Academy of Management, Miami, FL, August 14, 1991; *Research in Corporate Social Performance and Policy*, James E. Post (ed.), JAI Press, 1992.

"Structural Adjustment Through Industry Deregulation: The U.S. Experience in Telecommunications and Transportation," invited paper, Pacific Economic Cooperation Conference on Structural Adjustment, Kyoto, Japan, October 11, 1990; published in *PECC Conference Proceedings*, 1991.

"Gaining Competitive Advantage through Strategic Public Policies: The Case of Japanese Telecommunications," invited lecture, National Economists Club, Washington, D.C., June 1988; published in *Economics and the Public Interest*, Richard T. Gill (ed.); Mayfield Publishing: Mountain View, CA, 1991.

"The Political Economy of Regulation: Analysis of Market Failures and Regulatory Responses," with James A. Carman, *Scaling the Corporate Wall: Readings in Social Issues of the Nineties*, S. Prakash Sethi, Paul Steidlmeier and Cecilia M. Falbe (eds.); Prentice-Hall: Englewood Cliffs, 1991.

"Telecommunications Services as a Strategic Industry: Implications for United States Policy," *Competition and the Regulation of Utilities*, Michael A. Crew (ed.), Kluwer Academic Publishers: Boston, 1990.

"Telecommunications as a Strategic Industry: Is There a Threat?" *Povernomics: Economics and Strategy After the Cold War*, Clyde V. Prestowitz, Jr., Ronald Morse and Alan Tonelson (eds.), University Press of America, 11. Reprinted from *Vital Speeches of the Day* LV(12), April 1989. Invited lecture, New York University Symposium on Telecommunications and Economic Development, December 1988.

"New Plans for Joint Ventures," with David C. Mowery, *The American Enterprise*, Sept/Oct 1990.

"Strategies for Innovation: An Overview," with David C. Mowery, *California Management Review* 32(3), Spring 1990, Co-Editor of Special Issue, "Strategies for Innovation."

"The Implications of Divestiture and Regulatory Policies for Research, Development and Innovation in the U.S. Telecommunications Industry," presented to Telecommunications Policy Research Conference, September 1988; *Telecommunications Policy*, April 1990.

"Telecommunications Policies in Japan: Lessons for the U.S.," presented to Advanced Workshop in Regulation and Public Utility Economics, Monterey, CA, July 1988; presented to Telecommunications Policy Research Conference, October 1988; *California Management Review* 31(3), Spring 1989.

"California Telecommunications Policy for the Twenty-First Century," *Report to the California Economic Development Corporation*, Sacramento, June 1988.

"A Qualitative Choice Analysis of Rail Routings: Implications for Vertical Foreclosure and Competition Policy," with Curtis A. Grimm, *The Logistics & Transportation Review*, March 1988.

"Horizontal Merger Policy: Promoting Competition and American Competitiveness," with Lawrence A. Sullivan, *Antitrust Bulletin*, January 1987.

"The Political Economy of Regulation," with James M. Carman, *Business & Society*, S.P. Sethi and C. Falbe (ed.), Lexington Books: Lexington, 1987.

"Public Regulation of Market Activity: Regulatory Failures," with James M. Carman, *Journal of Macromarketing*, Spring 1986.

"The Effects of Railroad Mergers on Industry Productivity and Performance," with Curtis M. Grimm, invited paper to Transportation Research Board, National Academy of Engineering, January 1986; *Transportation Research Record* 1029, 1986.

"Revitalization of the U.S. Freight Industry: An Organizational Perspective," with Curtis M. Grimm, *International Railway Economics*, K. Button & D. Pitfield (eds.); Croom: London, 1985.

"The Values of Economic Theory in Management Education," *The American Economic Association Papers & Proceedings* 74(2), May 1984.

"Public Regulation of Market Activity: Regulatory Responses," with James M. Carman, *Journal of Macromarketing*, Spring 1984.

"Antitrust Market Definition: An Integrated Approach," with Thomas M. Jorde, *California Law Review* 72(1), January 1984. Reprinted in *Corporate Counsel's Annual*, Matthew Bender, 1985. Reprinted in *Antitrust Anthology*, edited by A. I. Gavil, Anderson Publishing, 1995.

"Structural Economics of the U.S. Rail Freight Industry: Concepts, Evidence and Merger Policy Implications," with Curtis M. Grimm, *Transportation Research* 17A(4), July 1983.

"Vertical Foreclosure in the Rail Freight Industry: Economic Analysis and Public Policy Prescriptions," with Curtis M. Grimm, *ICC Practitioners' Journal*, July 1983.

"Market Definition in the Merger Guidelines: Implications for Antitrust Enforcement," with Thomas M. Jorde, *California Law Review* 71(3), March 1983. Reprinted in *Antitrust Policy in Transition: The Convergence in Law and Economics*. Fox and Halverson (eds.), American Bar Association, 1984.

"Public Regulation of Market Activity: Institutional Typologies of Market Failures," with James M. Carman, *Journal of Macromarketing*, Spring 1983.

"Potential Benefits of Rail Mergers: An Econometric Analysis of Network Effects on Service Quality," with Clifford Winston, *Review of Economics and Statistics* 65(1), February 1983.

"Regulation: A Long Term Perspective," *Business Environment Public Policy: The Field and Its Future*, Edwin M. Epstein and Lee E. Preston (eds.), St. Louis, 1982.

"The Financial Performance and Prospects of Railroads in the South and Southwest," with Curtis M. Grimm, *Texas Business Review*, November/December 1982.

"More on Passing On: A Reply to Cooter and to Viton and Winston," with Lawrence A. Sullivan, *Pennsylvania Law Review* 129:6, June 1981.

Rationalizing the Rail Freight System: Costs and Benefits of Branch Line Abandonments, U.S. Department of Transportation, Washington, D.C., 1981.

"Determinants of Railroad Profitability: An Econometric Study," with Theodore E. Keeler, *Economic Regulation: Essays in Honor of James R. Nelson*, William G. Shepherd and Kenneth D. Boyer (eds.), Michigan State University Press, 1981.

"Passing on the Monopoly Overcharge: A Response to Landes and Posner," with Lawrence A. Sullivan, *Pennsylvania Law Review* 128(5), May 1980.

"Suppliers of Last Resort: Economics of Self-Supply in Common Carrier Industries," with Robert A. Meyer, *Quarterly Review of Economics and Business* 19(4), Winter 1980.

"Economic Analysis of Light Density Rail Lines," *The Logistics and Transportation Review* 16(1), Winter 1980.

"Passing on the Monopoly Overcharge: A Comprehensive Policy Analysis," with Lawrence A. Sullivan, *Pennsylvania Law Review* 128(2), December 1979.

"Rationalizing the Physical Structure of the U.S. Rail Freight Industry," *National Railroad Policy*, Joint Economic Committee, U.S. Congress, Washington, D.C., Government Printing Office, 1979.

"Simple Analytics of Rail Costs and Disinvestment Criteria," *Transportation Research Record* 687, 1978.

"Economics of Traffic Density in the Rail Freight Industry," *Bell Journal of Economics* 8(2), Autumn 1977.

PAPERS, REPORTS, PRESENTATIONS & PROFESSIONAL PROCEEDINGS

"Telecommunications Trade and Investment Opportunities in China and India," presented to the Massachusetts Telecommunications Council, Boston, February 1995.

"The Strategic Implications of Interactive Broadband Telecommunications Networks for Competition and Public Policy," presented to the National Communications Forum, Chicago, September 1994.

"Competitive Implications of Vertical Relations between Equipment Vendors and Telecommunications Services: Lessons from the French Experience," with Joanne Oxley, presented to European Regional Conference of the International Telecommunications Society, Stenungsbaden, Sweden, June 21, 1993.

"Obtaining Competitive Intelligence and Creating Competitive Advantage through the Public Policy Process," with Steven Harris, invited paper, Annual Conference of the Society for Competitive Intelligence Professionals, Los Angeles, April 2, 1993.

"Deployment and Adoption of Integrated Services Digital Network in the U.S.: Progress and Public Policy Obstacles," with Luis Enriquez, invited paper, Twenty-Fourth Annual Conference, Michigan State University Institute of Public Utilities, Williamsburg, Virginia, December 8, 1992.

"Market Definition and Market Power in the Sports and Entertainment Industry," invited presentation, Antitrust Section, American Bar Association Annual Proceedings, San Francisco, August 1992.

"The Design of Incentive Regulation for Telecommunications," invited presentation, Conference on Alternative Regulation, Illinois Commerce Commission, Chicago, July 1992.

"The Effects of Public Policies on ISDN Deployment and Adoption in the U.S.," presented to International Telecommunications Society, Cannes, France, June 1992.

"Removing the MFJ Restriction on InterLATA Services," invited testimony, Subcommittee on Telecommunications & Finance, U.S. House of Representatives, Washington D.C., May 1992.

"The Implications of Telecommunications Infrastructure Investment for R&D, Innovation and Competitiveness," invited testimony, Subcommittee on Communications, U.S. Senate, Washington D.C., February 1992.

"Principles of Costing and Pricing for Telecommunications Regulatory Policy," invited testimony, Colorado Public Utilities Commission En Banc Hearing, Denver, February 1992.

"Deregulation and Interstate Bank Entry in California," with Lee Burke, Research Report of the California Policy Seminar, UC Berkeley, April 1991.

"Assessing the Future of Telecommunications in the Global Economy," invited address, California Telephone Association, Monterey, CA, February 1991.

"Economic Rationale for a National Fiber Optic Infrastructure," invited address, Congressional Staff Forum on Telecommunications (sponsored by Ameritech), Washington D.C., February 1991.

"Applications of Incentive Regulation: An International Comparison," invited presentation, Conference of California Public Utilities Counsel, Long Beach, CA, October 1990.

"The Role of Telecommunications in Regional Economic Development," invited address, Rocky Mountain State Leaders Conference, Billings, Montana, October 1990.

"Telecommunications and Public Policies in the Global Market," invited address, Carnegie Council, New York, NY, October 1990.

"Why We Need a National Telecommunications Policy: A Comparative Perspective," invited address, Policy Issues Management Conference, Bell Communications Research, Murray Hill, NJ, October 1990.

"Incentive Regulation for Telephone Utilities," invited presentation, Workshop of the Colorado Public Utilities Commission, Denver, September 1990.

"The Role of Telecommunications Policy," invited lecture, Conference on Economic Development in the Pacific Northwest, Portland, Oregon, September 1990.

"The Changing Economics of Telecommunications: Implications for U.S. Policy and Competitiveness," invited briefing of U.S. Congressional staff on telecommunications (sponsored by Pacific Telesis), San Francisco, August 1990.

"Communications Competitiveness and Infrastructure Modernization Act of 1990," invited testimony, Communications Subcommittee, U. S. Senate, Washington D.C., July 1990.

"Investing in America's Future," invited essay, 1989 Annual Report of Southwestern Bell Corporation, St. Louis, 1990.

"The Public Switched Telephone Network and Rural Economic Development," invited lecture, Montana State Leaders' Conference, Helena, April 1990.

"Is Public Policy Meeting the Needs of Consumers?" invited panelist, Conference on Telecommunications Technologies and Policies, Center for Communications and Information Science & Policy, University of Pennsylvania, March 1990.

"Telecommunications as a Strategic Industry," invited address, New England Council, Boston, February 1990.

"Fiber to the Customer: A Public Policy Perspective," invited paper, Western Communications Forum, San Diego, February 1990.

Session Chair and Moderator, "State Regulatory Reform: Recent and Future Trends," Fifth Conference on State Telecommunications Regulation, University of Utah, Salt Lake City, January 1990.

Invited Panelist, "Crossroads of Information Technology," Board on Telecommunications and Computer Applications, National Academy of Engineering, Washington D.C., October 1989

Invited panelist in the "Industry Forum," Annual Meeting of the U.S. Telephone Association, San Francisco, October 1989.

"Strategic Lessons from Deregulated Industries," paper presented to Strategic Management Society, San Francisco, October 1989.

"Deregulation in the Transportation Industries: Lessons for Telecommunications Managers," invited paper, Center for Telecommunications Management, University of Southern California, October 1989.

"Price Cap Regulation and Economic Forecasting," invited presentation to 1989 National Forecasting Conference, Bell Communications Research, San Francisco, May 1989.

"The Strategic Implications of Telecommunications Deregulation in Europe," invited presentation, Strategic Management Society, Amsterdam, October 1988.

"Telecommunications Deregulation: Implications for the California Economy," invited presentation, California Foundation for the Environment and the Economy, Carmel, June 1988.

"A Comparison of U.S. and Japanese Policies toward Information Technologies," invited presentation, International Public Economics Association, Tokyo, May 1988.

"Information Technologies, Public Policy, and Regional Economic Development," invited address, Conference on Regional Development in Japan, Hokkaido University, Sapporo, Japan, May 1988.

"The Implications of Line-of-Business Regulation for Diversification Strategy & Enterprise Structure," presented to Strategic Management Society, Boston, October 1987.

"Alternative Regulatory Frameworks for Local Exchange Carriers," invited presentation, En Banc Hearing of the California Public Utility Commission, September 1987.

"Emerging Telecommunications Policies in Europe," Briefing of California Legislative Leaders, Los Angeles, September 1987.

"Japanese Corporate Philanthropy in the United States," presented to Academy of Management, New Orleans, August 1987; Center for Research in Management Working Paper BPP-23; published in summary form in *Strategic Directions*, with Barbara Lombardo and David Vogel, April 1989.

"The Effects of Deregulation on Competition and Competition Policy in Banking: A Review of the Literature," Working Paper No. 4, National Center for Financial Services, Berkeley, August 1987.

"Competitive Strategies under Regulatory Constraint: Implications of the AT&T Divestiture on Vertical Relations in Telecommunications," with David J. Teece, paper presented to Strategic Management Society, Singapore, 1986.

"The Economic Consequences of Deregulation," invited address, Emerging Issues Program, Conference of National State Legislative Leaders, Los Angeles, September 1986.

"Public Policies toward Utility Diversification: An Overview," invited presentation, California Policy Seminar/California Senate Office of Research, Berkeley, April 1986.

"New Technologies for Local Loop Access: An Economic and Regulatory Analysis," with Gary Pisano, Office of Technology Assessment, United States Congress, June 1985.

"Corporate Community Involvement in the Greater San Francisco Bay Area," with D. Vogel and J. Logsdon, Center for Research in Management Working Paper, Berkeley, May 1985.

"The Future of Telecommunications Regulation," invited presentation, En Banc Hearing of the California Public Utilities Commission, San Francisco, November 1984.

"Testimony in Support The Taxpayer Antitrust Enforcement Act," Judiciary Committee, U.S. Senate, May 1984.

ADMINISTRATIVE POSITIONS, UNIVERSITY OF CALIFORNIA**WALTER A. HAAS SCHOOL OF BUSINESS**

Chair, Business and Public Policy Group (1983-84, 1986-93).
Policy and Planning Committee (1986-88; 1991-93); Chair (1987-88; 1992-93).
Chair, Program in Business and Social Policy (1986-90).
Business School Building Program Committee (1986-91).
Ph.D. Field Advisor, Business and Public Policy (1981-87; 1989-91).
Policy and Planning Committee (1991-3; Chair, 1992-93).
Member, Board of Directors, Washington Campus Program (1990-93).
Director, The Executive Program (1983-85).
Director, Executive Programs in Telecommunications (1989-92).
Chair, Executive Education Task Force (1991-93).
Member, Board of Directors, Berkeley Center for Executive Development

UNIVERSITY OF CALIFORNIA, BERKELEY

Executive Committee, Center for Research in Management (1989-).
Advisory Board, Lester Center for Innovation and Entrepreneurship (1992-).
Chancellor's Advisory Committee on Parking (1988-89).
Executive Committee, National Financial Services Center (1986-88).
Executive Committee, Institute of Transportation Studies (1981-83).
Director, Center for Transportation Policy Research (1980-2).

UNIVERSITY OF CALIFORNIA, SYSTEMWIDE

Working Group on Technology Transfer (1988-90).
Task Force on Telecommunications and Information Policy Research (1984-85).

PROFESSIONAL AFFILIATIONS

American Economic Association
Academy of Management
Strategic Management Society
International Telecommunications Society
Association of Public Policy Analysis and Management

SERVICE TO PROFESSIONAL JOURNALS, SOCIETIES & PUBLIC AGENCIES

Governor's Ad Hoc Committee, Golden State Quality Awards (1991-92)
Chair, Ninth Annual International Conference of the Strategic Management Society, 1989, San Francisco
Associate Editor, California Management Review
Associate Editor, Logistics and Transportation Review
Editorial Advisory Board, Transportation Research
Session organizer, Telecommunications Policy Research Conference (1988, 1989)
Session organizer, Academy of Management (1991).
Reviewer/Referee: Bell/RAND Journal of Economics; Industrial and Corporate Change; Journal of Asian Economics; Journal of Economics and Business; Journal of Public Policy Analysis & Management; Journal of Regulatory Economics; National Science Foundation; Quarterly Review of Economics and Business; Review of Economics and Statistics; Telecommunications Policy.

CONSULTING & TESTIMONY

Economic Consulting to Public Agencies:

California Department of Consumer Affairs (industry analysis; telecommunications policy); California Office of Attorney General (antitrust analysis in tire industry, merger analysis in food retailing industry, resale price maintenance in consumer electronics, infant formula pricing); California Public Utilities Commission (teach regulatory economics & policy to Commission staff); Interstate Commerce Commission (rate regulatory policy, merger policy, costing methodology); Office of Technology Assessment (telecommunications policy); U.S. Department of Transportation (railroad industry rationalization, merger policy); U.S. General Accounting Office (transportation policy).

Economic Consulting/Regulatory Expert Testimony to Private Enterprise:

Pacific Bell (product pricing, competitive strategy, regulatory policy, broadband deployment, MFJ interLATA relief); US WEST (regulatory policy, costing and pricing principles); Ameritech (price regulation; local competition policy); General Telephone (pricing, regulatory policy); Western Coal Traffic League (railroad pricing); Consolidated Freightways (motor carrier pricing); Southern Pacific Transportation Co. (route rationalization analysis; rail merger analysis; pricing of trackage rights); American Presidents Intermodal Co. (competition policy, merger analysis); Bell Communications Research (R&D policy analysis); Bell Atlantic (price regulation, cable rate regulation; cellular telephone joint venture); Southwestern Bell (price regulation, local competition policy); BellSouth (price regulation, local competition policy); NYNEX (FCC spectrum auction rules); United States Telephone Association (FCC price regulation); MFJ Task Force (MFJ manufacturing relief).

Economic Consulting/Business Litigation Expert Witness Testimony:

Electrical contracting; biotechnology manufacturing equipment; pipe fabrication; vision care services; electronic lighting ballasts; motion picture production, distribution and exhibition; regional shopping center development, semiconductor manufacturing equipment; digital-analog converters; workmen's compensation insurance; semiconductor manufacturing; semiconductor manufacturing.

PRIOR/OTHER EMPLOYMENT

Deputy Director, Cost, Economic and Financial Analysis, Bureau of Accounts, Interstate Commerce Commission, Washington, D.C. (on leave, University of California); (1980-81).
Director, ARTRAIN (traveling art education exhibit), Michigan Council for the Arts, Detroit, (1971-72).
President, Young America Corporation (direct marketing of specialty products), St. Louis (1969-71).
Public Relations Consultant (TIME, Inc.; Rockefeller for President Committee; Young Citizens for Humphrey; Student Coalition for Congressional Action), New York and Washington D.C. (1967-69).
Vice President, National Student Marketing Corporation, Washington D.C. (1966-67).
Staff Assistant, Office of the Governor, State of Oregon, Salem (1966).
Public Relations Field Representative, General Motors Corporation, Warren, Michigan (1965).

(2) Among the experiences of mine most pertinent to my submission in this proceeding are that I was Chairman of the New York State Public Service Commission between 1974 and 1977 and of the Civil Aeronautics Board in 1977-78; I am the author of the two-volume The Economics of Regulation, published originally by John Wiley & Sons in 1970 and 1971 and reprinted in 1988 by The MIT Press; I have written and testified extensively on the subject of telecommunications regulatory policy and published a book and numerous articles on antitrust policy. I was a member of the Attorney General's National Committee to Study the Antitrust Laws and the National Commission for the

Review of Antitrust Laws and Procedures. I have been advisor on telecommunications policy to Governor Carey, of New York State, and recently completed service as a member of the Ohio Blue Ribbon Panel on Telecommunications Regulatory Reform and of the New York State Telecommunications Exchange. I attach a copy of my full résumé as an Appendix to this affidavit.

(3) In its consideration of possible refinements and revisions of the rate caps to which Bell Atlantic is subject, which constitute the specific subject of this proceeding, I suggest it is essential that the Commission bear in mind its broader policies for the reform of telecommunications regulation generally, of which the imposition of rate caps has been an important component. The purpose of this submission is--at the risk of telling the Commission things it already knows and reminding it of the policies on which it has already embarked--to place the specific issues raised by the several parties in the broader context of the rapid and fundamental changes that are taking place in the telecommunications industries and the consequent urgent need for continued reform of the way in which it is regulated.

II. THE DEVELOPING COMPETITION IN TELECOMMUNICATIONS

(4) The telecommunications industry is undergoing rapid, fundamental transformation, a transformation extending to what has until recently been the very core of franchised monopoly, the local exchange network and local service. The imminence of ubiquitous competitive challenges to the LECs from cable television companies is the most recent and perhaps most dramatic development: by 1992 their coaxial cable already passed some 93 percent of all American households and their subscribers constituted about 58 percent;¹ and they are clearly planning, often in collaboration with others, to convert their systems to offer two-way switched services. The most striking of these alliances have been with out-of-territory telephone companies--US West's investment in Time Warner, Southwestern Bell's acquisition of the cable properties of Hauser and Bell Canada's investment in Jones Intercable--with the LECs combining their capital and expertise with

¹"Statistical Abstract of the United States 1993," U.S. Department of Commerce, p. 55 and "Kagan Media Index Historical Data Base," March 23, 1994, p. 10. According to NCTA, cable now passes some 97 percent of all television households and serves over 63 percent. Cable Television Developments, April 1994, 1-A.

the facilities of the cable companies directly to challenge the incumbent local telephone companies. Early fruitions of these developments are the recent announcements by the Southwestern Bell cable system in Montgomery County, Maryland, that it will provide ubiquitous local telephone service in competition with Bell Atlantic and by Time Warner that it will offer local telephone service in Rochester, New York, in direct competition with Rochester Telephone.² Almost simultaneously, MFS, one of the largest CAPs, which already has authority to provide local service in Maryland and New York State, announced that it would do so also in Rochester.³ In addition, nonwireline cellular companies, using the radio spectrum, offer a means of access to a growing body of subscribers alternative to that of the LECs. Subscribers to cellular telephone accounted for 11.5 percent of all households in 1992 and are growing at some 46.5 percent a year.⁴ This trend explains AT&T's planned acquisition of McCaw cellular and MCI's \$1.5 billion investment in Nextel, another wireless provider. Other potentially even more ubiquitous wireless offerings, such as personal communication services, are on the horizon.

(5) The proliferation of competitive alternatives has been most extensive in the case of LEC access services, where it has been actively supported by this Commission and state regulatory bodies. These growing pressures are not surprising considering that these services, and particularly high volume access services for business customers, are provided in heavily concentrated and relatively small geographic areas and have historically been priced at artificially high levels in order to subsidize residential local rates. These two factors--high geographic concentration and large markups--encourage customers to bypass the LEC facilities. For example, MCI recently announced plans to "wage the biggest war [they] possibly can" on the local telephone companies, including \$2 billion of investment

²"Southwestern Bell Plans Phone Service For Its Cable Customers in Sibling's Turf," The Wall Street Journal, May 23, 1994; "Time Warner Plans to Provide Switched Telephone Service In Rochester After Approvals Are Received," Time Warner Cable Corp. Affairs, May 16, 1994.

³"MFS, Following Time Warner, to Enter Local Phone Market in Rochester, NY," The Wall Street Journal, May 19, 1994, p. B8.

⁴"1993-1994 Telecommunications Market Review and Forecast," North American Telecommunications Association, p. 90. Statistical Abstract of the United States 1993, U.S. Department of Commerce, p. 55. Growth rate is for the period 1989-1992. According to Cable Telecommunications Industry Association (CTIA) there are now 16 million subscribers to cellular service. The Wireless Factbook, Spring 1994, p. 1.